

Listing of Claims

1.(Currently Amended) An instrument for curing light-curable compounds which are curable in the mouth of a patient, the instrument comprising:

a housing;

a plurality of solid state, light-emitting elements, the elements comprising semiconductor junctions and being mounted on a substrate supported by the housing to form a collective array on said substrate, the array of elements operable for collectively emitting light having wavelengths within a narrow band of wavelengths;

a generally clear layer simultaneously covering all of the plurality of light-emitting elements for protecting the array of semiconductor junctions;

an optically reflective element coupled to surround the plurality of light-emitting elements to capture the collective light from ~~an~~ the array of light-emitting elements and direct it forwardly away from the collective array and ultimately to a compound for curing.

2.(Previously Presented) The instrument of claim 1 wherein said solid state elements are light emitting dies formed of a semiconductor material.

3. (Previously Presented) The instrument of claim 1 further comprising a heat sink thermally coupled to the substrate for absorbing heat generated by the array of elements.

4. (Previously Presented) The instrument of claim 1 further comprising a thermally conductive element which is thermally coupled to the substrate for conductively transferring heat generated by the array of elements away from the substrate.

5. (Previously Presented) The instrument of claim 1 further comprising a heat exchanger which is thermally coupled to the substrate for dissipating heat generated by the array of elements.

6. (Previously Presented) The instrument of claim 1 further comprising a first heat sink element thermally coupled to the substrate for absorbing heat generated by the array of elements, and a heat exchange element thermally coupled to the heat sink for conductively transferring heat generated by the array of elements.

7. (Previously Presented) The instrument of claim 1 wherein said housing comprises a barrel portion having a proximal end spaced from a distal end of the barrel portion, the distal end being configured to be placed in the mouth of a patient, the array of light-emitting elements being positioned proximate to said proximal end, a light transmitting device being operably coupled to said array for transmitting the light beam from the array to the housing distal end.

8. (Currently Amended) The instrument of claim 7 wherein said light transmitting device comprises a plurality of fiber optic elements operably coupled together for directing said beam.

~~to the mouth of the patient.~~

9. (Previously Presented) The instrument of claim 1 further comprising a portable power supply positioned within said housing for portable operation of the instrument.

10. (Previously Presented) The instrument of claim 1 wherein said array of elements has a density of elements on the substrate operable for collectively emitting a power density of light in the range of 200 to 1400 mW/cm².

11. (Previously Presented) The instrument of claim 7 wherein said light transmitting device has an acceptance angle, said optical focusing device operable for generating a beam of light which does not diverge significantly from said acceptance angle.

12. (Previously Presented) The instrument of claim 11 wherein said array of light-emitting elements emits light in the range of 0E - 180E and said optical focusing device is operable for collimating the light into a beam which does not diverge significantly from said acceptance angle.

13.(New) An instrument for curing light-curable dental compounds, the instrument comprising:

at least one light-emitting element having a generally bare semiconductor junction mounted on a substrate and operable for collectively emitting light having

wavelengths within a narrow band of wavelengths suitable for curing dental compounds;

a generally clear protective layer covering the semiconductor junction for protecting the junction, light generated by the light-emitting element passing through the protective layer;

an optically reflective element coupled to surround the light-emitting element and protective layer and operable to capture the light generated by the light-emitting element and direct it generally forwardly.

14.(New) The instrument of claim 13 further comprising a light transmitting device being operably coupled to the light-emitting element for transmitting the light emitted by the element toward a curing site.

15. (New) The instrument of claim 13 further comprising a plurality of heat dissipating elements mounted behind the substrate holding the semiconductor junction for conductively transferring heat generated by the junction.

16.(New) The instrument of claim 13 further comprising a plurality of generally bare semiconductor junctions mounted on a substrate to form a collective array on said substrate.

17.(New) An instrument for curing light-curable dental compounds, the instrument comprising

a first plurality of light-emitting elements, the first elements comprising generally bare semiconductor junctions forming a collective array operable for collectively emitting light having within a narrow band of wavelengths suitable for curing a dental compound;

a second plurality of light-emitting elements, the second elements comprising generally bare semiconductor junctions forming a collective array operable for collectively emitting light within a narrow band of wavelengths suitable for curing a dental compound and operating separately from the first plurality of light-emitting elements;

a generally clear protective layer covering the semiconductor junctions of at least one of the pluralities of light-emitting elements for protecting the junctions, light generated by the plurality of light-emitting elements passing through the protective layer;

an optically reflective element coupled to surround at least one of the pluralities of light-emitting elements and operable to capture the light generated by the plurality of light-emitting elements and direct it generally forwardly.

18.(New) The instrument of claim 17 further comprising a generally clear protective layer covering the semiconductor junctions of both pluralities of light-emitting elements for protecting the junctions, light generated by the plurality of light-emitting elements passing through the protective layer.

19.(New) The instrument of claim 17 further comprising an optically reflective element coupled to surround both pluralities of light-emitting elements and operable to capture the light generated by the pluralities of light-emitting elements and direct it generally forwardly.